ABSTRACT

A lens for focusing an ultrasound wave having a wavelength, includes a plurality of substantially concentric rings disposed about a central point, at least one of the rings having a substantially triangular cross-section defined by first, second, and third sections, the first section extending from a proximal end radially away from the central point to a distal end, the second section extending from the distal end of, and substantially perpendicular to, the first section and terminating at a peak, and the third section smoothly sloping from the proximal end of the first section to the peak of the second section, and wherein the first, second and third sections have lengths with respect to the wavelength of the ultrasound wave such that (i) phases of the ultrasound wave are substantially additive at a focal point located on an axis perpendicular to the lens that passes through the central point, and (ii) aggregate focused ultrasound energy would not be predicted at the focal point by Snell's law refraction.